

**WHAT IS CLAIMED IS:**

1. A code division multiple access (CDMA) base station system, comprising:  
a channel card, configured to modulate and output a first signal and receive  
and demodulate a second signal;

a transmitter configured to transmit the first signal outputted from the  
5 channel card through a first antenna;

a receiver configured to receive a signal from a second antenna and provide  
the received signal to the channel card;

a radio frequency (RF) characteristic analyzer, configured to monitor output  
signals of the transmitter and the receiver and analyze characteristics of the transmitter  
10 and the receiver, and generating a result of the monitoring and analysis;

a first processor configured to provide an interface among the channel card,  
the transmitter, the receiver, and the RF characteristic analyzer and to receive the result  
from RF characteristic analyzer;

a power level measuring device, to measure a power level of a final end of  
15 the base station, and provide the power level to the first processor; and

a second processor, configured to provide an interface between the first  
processor and an exchange.

2. The system of claim 1, wherein the RF characteristic analyzer comprises:  
a first analyzing circuit to monitor and analyze the output signal of the  
transmitter;  
a second analyzing circuit for monitoring and analyzing the output signal  
5 of the receiver;  
an alarm circuit to receive analyzed data from the first and second analyzing  
circuits and generate an alarm signal;  
an input/output circuit configured to communicatively couple the RF  
characteristic analyzer with the first processor; and  
10 a power supply to supply power to the RF characteristic analyzer.

3. The CDMA base station system of claim 2, wherein the first analyzing  
circuit comprises:  
a first filter configured to receive the output signal of the transmitter and  
filter a specified signal band;  
5 an analog-to-digital converter coupled to receive an analog output signal of  
the first filter and convert it into a digital signal;  
a second filter coupled to receive an output signal from the analog-to-digital  
converter and pass therethrough only a prescribed frequency of the output signal;

a differentiator coupled to receive an output of the second filter and  
10 determine whether a strength of the signal outputted from the analog-to-digital converter  
is increasing;

a sign changer coupled to receive an output signal of the differentiator and  
change a sign of the output signal of the differentiator;

an integrator coupled to receive the output of the second filter and output  
15 a positive integer value if the output signal of the second filter is greater than a prescribed  
value; and

a logic gate coupled to logically combine an output signal of the sign changer  
and an output of the integrator.

4. The system of claim 3, wherein the first filter is a band rejection filter and  
the second filter is a low pass filter.

5. The CDMA base station system of claim 2, wherein the second analyzing  
circuit comprises:

a first filter configured to receive the output signal of the receiver and pass  
only a first prescribed signal band;

5 an analog-to-digital converter coupled to receive the band signal and convert  
it to a digital signal;

a second filter coupled to receive the digital signal and pass therethrough only a second prescribed frequency of the digital signal;

a differentiator coupled to receive an output signal of the second filter and determine whether a strength of the digital signal is increasing;

a sign changer coupled to receive an output signal of the differentiator and change a sign of the output signal of the differentiator;

an integrator coupled to receive the output of the second filter and output a positive integer value if the output signal of the second filter is greater than a prescribed value; and

a logic gate coupled to logically combine an output signal of the sign changer and an output of the integrator.

6. The system of claim 5, wherein the first filter is a band pass filter and the second filter is a low pass filter.

7. The system of claim 2, wherein the first analyzing circuit monitors and analyzes the output of the transmitter in real time, and wherein the second analyzing circuit monitors and analyzes the output of the receive in real time.

8. A code division multiple access (CDMA) base station system, comprising:  
a transmitter configured to modulate and transmit a first signal through a  
first antenna;  
a receiver configured to receive and demodulate a second signal through a  
5 second antenna;  
a radio frequency (RF) characteristic analyzer coupled to to monitor and  
analyze an output signal of each of the transmitter and receiver and determine an extent  
of signal degradation, and to provide a monitoring signal based on the level of  
degradation.

9. The system of claim 8, wherein the RF characteristic analyzer comprises:  
a first analyzing circuit coupled to monitor and analyze an output signal of  
the transmitter in real time;  
a second analyzing circuit coupled to monitor and analyze an output signal  
5 of the receiver in real time; and  
an alarm circuit coupled to receive analyzed data from the first and second  
analyzing circuits, and generating the monitoring signal.

10. The system of claim 9, wherein the first analyzing circuit comprises:

a band rejection filter coupled to receive the transmitter output signal and filter out a prescribed band of the signal;

5 a first analog-to-digital (A/D) converter coupled to convert an output of the band rejection filter into a digital signal;

a first low pass filter coupled to the A/D converter to pass only a low frequency digital signal;

a first signal processor coupled to determine whether a strength of the low frequency digital signal is increasing;

10 a first output circuit coupled to change a sign of an output signal of the first signal processor and generate a first output signal;

a second signal processor coupled to determine if the strength of the low frequency digital signal is greater than a prescribed threshold value; and

15 a second output circuit coupled to logically combine the first output signal with an output of the second signal processor and generate a second output signal.

11. The system of claim 10, wherein the second analyzing circuit comprises:

a band pass filter coupled to receive the receiver output signal and pass only a prescribed band of the signal;

a second A/D converter coupled to convert an output of the band pass filter  
5 into a digital signal;

a second low pass filter coupled to the A/D converter to pass only a low  
frequency digital signal;

a third signal processor to coupled to determine whether a strength of the  
low frequency digital signal is increasing;

10 a third output circuit coupled to change a sign of an output signal of the  
third signal processor and generate a third output signal;

a fourth signal processor coupled to determine if the strength of the low  
frequency digital signal is greater than a prescribed threshold value; and

a fourth output circuit coupled to logically combine the third output signal  
15 with an output of the fourth signal processor to generate a fourth output signal.

12. The system of claim 11, wherein the alarm circuit generates a first  
monitoring signal in response to the first output signal, a second monitoring signal in  
response to the second output signal, a third monitoring signal in response to the third  
output signal, and a fourth monitoring signal in response to the fourth output signal.

13. The system of claim 11, wherein the first and third signal processors each comprise a differentiator, the second and fourth signal processors each comprise an integrator, and the second and fourth output circuits comprise an and gate.

5 14. A RF characteristic analyzer for a communications system, comprising:  
an input/output module, coupled to the communications system;  
a first analyzing circuit coupled to receive and analyze a transmission signal of the communications system through the input/output module;  
a second analyzing circuit coupled to receive and analyze a reception signal of the communications system through the input/output module;  
an alarm circuit coupled to receive analyzed data from the first and second analyzing circuits, and configured to provide at least one alarm message according to the analyzed data.

15. The RF characteristic analyzer of claim 14, wherein the first analyzing circuit comprises:

an analog-to-digital (A/D) converter coupled to receive the transmission signal and convert it into a digital output signal;

5 a differentiator coupled to receive the digital output signal of the A/D converter and generate a differentiated output signal;



an integrator coupled to receive the digital output signal of the A/D converter and generate an integrated output signal.

16. The RF characteristic analyzer of claim 15, further comprising a channel card coupled to modulate the transmission signal and demodulate the reception signal, a transmitter to transmit the modulated transmission signal through a transmitting antenna, a receiver to receive a signal demodulated by the channel card, a first processor to provide  
5 an interface among the channel card, the transmitter, the receiver, and the input/output module, and a second processor to provide an interface between the first processor and an exchange.

17. The RF characteristic analyzer of claim 15, wherein the first analyzing circuit further comprises:

a band rejection filter coupled to receive and filter the transmission signal and to provide a filtered signal having a prescribed band of frequencies to the A/D  
5 converter;

a low pass filter coupled to receive the digital output signal of the A/D converter and provide a low frequency digital signal to each of the differentiator and integrator;

a sign changer coupled to receive the differentiated output signal of the  
10 differentiator and change the sign of the differentiated output signal to provide first  
analyzed data; and

a logic gate coupled to logically combine an output signal of the sign changer  
and the integrated output signal of the integrator to provide second analyzed data.

18. The analyzer of claim 17, wherein the first analyzed data indicates whether  
a signal strength of an unused band of frequencies is increasing, and the second analyzed  
data indicates whether the signal strength of the unused band of frequencies is increasing  
and exceeds a prescribed value.

19. The RF characteristic analyzer of claim 14, wherein the second analyzing  
circuit comprises:

an analog-to-digital (A/D) converter coupled to receive the reception signal  
and convert it into a digital output signal;

5 a differentiator coupled to receive the digital output signal of the A/D  
converter and generate a differentiated output signal;

an integrator coupled to receive the digital output signal of the A/D  
converter and generate an integrated output signal.

20. The RF characteristic analyzer of claim 19, wherein the second analyzing circuit further comprises:

a band pass filter coupled to receive and filter the reception signal and to provide a filtered signal having a prescribed band of frequencies to the A/D converter;

5 a low pass filter coupled to receive the digital output signal of the A/D converter and provide a low frequency digital signal to each of the differentiator and integrator;

10 a sign changer coupled to receive the differentiated output signal of the differentiator and change the sign of the differentiated output signal to provide first analyzed data; and

a logic gate coupled to logically combine an output signal of the sign changer and the integrated output signal of the integrator to provide second analyzed data.

21. The analyzer of claim 20, wherein the first analyzed data indicates whether a signal strength of an unused band of frequencies is increasing, and the second analyzed data indicates whether the signal strength of the unused band of frequencies is increasing and exceeds a prescribed value.

22. The analyzer of claim 20, wherein the differentiated output signal indicates whether a strength of the digital output signal is increasing and the integrated output

signal indicates whether the strength of the digital output signal is greater than a prescribed value.

23. The analyzer of claim 17, wherein the differentiated output signal indicates whether a strength of the digital output signal is increasing and the integrated output signal indicates whether the strength of the digital output signal is greater than a prescribed value.

24. A method of estimating signal degradation in a communication system, comprising

monitoring an output signal of at least one of a transmitter and a receiver;  
determining whether a signal strength of an unused band of frequencies is  
5 increasing;

determining whether the signal strength of the unused band of frequencies  
exceeds a prescribed value;

activating a first alarm if the signal strength of the unused band of  
frequencies is increasing; and

10 activating a second alarm if the signal strength of the unused band of  
frequencies exceeds the prescribed value.